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# Our American Land

Use the Land  
Save the Soil

Agriculture Information  
Bulletin 321

Soil Conservation  
Service

U.S. Department  
of Agriculture



*The productivity of our soil depends both on its natural fertility and on the skill and technology with which men use it.*









# *Our American Land*

*Use the Land  
Save the Soil*

*By the Soil  
Conservation  
Service*

Under all is the land. Land is what we live on. It is the foundation of the environment that shapes our lives. Our ability to adapt to our environment determines the level of civilization we attain. When we have food to eat, clothes to wear, houses to live in, and health to enjoy, it is because we have made good use of the land. Only then—when we are fed, clothed, housed, and healthy—do we have the time and energy for tasks that will raise our standard of living and create from our environment a higher civilization. Luxuries are possible only after the necessities of life have been assured.

But our American land is being divided and divided again for the multiple needs of a nation growing rapidly in population, in urban development, in highway mileage, and in an array of man-oriented uses alien to nature. Our American land that once seemed so limitless is shrinking before us at every turn—and we are made aware of a challenging crisis. Land uses are changing, and therein lies the crisis—are these changes right for our land and for us?

Civilization is based on the productivity of the land, and the United States is fortunate in having had abundant fertile land to begin with. Productivity depends, however, not only on the rich natural endowment of land but also on the skill and technology with which men use it.

Because our American land was so rich and vast, our forefathers were able to misuse it for more than a century. They had moved



*Rushing water carries topsoil with it.*

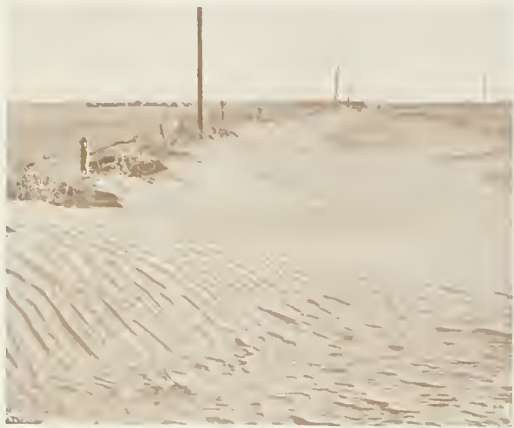
in on a continent of nearly two billion acres of forest and prairie. Underneath lay some of the most productive soils ever known to man. The pioneers worked hard to build their homes and establish their security. They tried to follow European farm practices, but the soils were not like those in Europe. As a result some of the soils suffered. Some of the pioneers recognized this—in fact, George Washington and Thomas Jefferson worried about soil erosion.

To the pioneers the land seemed unlimited. Even those farmers who were ruined by soil damage could abandon their gullies and find virgin soil if they moved inland. It was easier to make cropland from grassland than from the forests of the East. As the frontier moved westward, there was always more land available than our small population needed.

We look back on these migrations and tend to think of their effect on land as exploitation. But the pioneer farmer had to cut the timber and plow the sod to produce food. Erosion by water followed land clearing in the East, and erosion by wind and water followed in the West.

Floods also increased as the land was cleared. Flooding was the only water problem at first; scarcity of water became a serious problem later—first in the low-rainfall areas of the West and then in other parts of the country.

Land problems varied from one part of the country to another but the pattern was much the same: A single-resource approach to development, a single-practice approach to problems, and using up resources for immediate gain. In much of the Southeast, for



*Soil blown from farmland fills roadside ditches.*

*Steep slopes erode easily  
unless covered with grass or trees.*







example, cotton or tobacco became the single cash crop. As the farmers expanded their operations they cleared the slopes farther and farther up the hillsides. It mattered little if only a few crops were grown before the topsoil washed away. Two or three crops would pay for the land, and there was always more land to be brought into production with ax, fire, and plow. Crops were planted in rows and were clean tilled to keep down weeds.

Damage increased as steeper land was brought into cultivation. After the crops were harvested the land was left bare and exposed to the elements. During a single rain an inch of topsoil might be washed off sloping land. This soil accumulated along fence rows and in roadside ditches. It was fed into streams, and the streams ran thick with mud. Game fish disappeared. When the stream channels filled with sediment, water spread over the bottom land during a heavy rain. Floodwater subsided more slowly, increasing the damage. It left sand and other inert material on fertile bottom land. Reservoirs also filled with sediment and became useless.

The cotton farmer was not alone in his predicament. His was not unlike the situation faced by the rancher and wheatgrower of the West when the destruction of the native grasses of the Plains spawned the dust storms in the 1930's. In the fertile corn-producing areas of western Iowa some farmers were losing a ton of soil for every bushel of corn harvested. The same was true for some of the wheatland in the Palouse of Washington and Idaho.

Although the disappearance of the frontier was gradual, we ran out of fresh farmland at about the turn of the century. The early soil conservationists had been unable to get popular support for their ideas.



A.



B.



D.

- A. Land left bare is exposed to the elements.
- B. Rapid runoff from the watershed floods roads and farms on the bottom land.
- C. Receding floodwater often leaves unfertile sediment on good cropland.
- D. Sediment accumulates in stream channels, reducing their capacity.
- E. Many of our best reservoir sites have become useless.



C.



E.

The public did not become alarmed by the depletion of farmland until the depression and the drought of the 1930's. Both of these disasters had been building up for a long time. In the Great Plains, thousands of acres had been stripped of natural grass. When the drought came, the soil dried up and began to blow. Soil blew all the way to Washington, D.C. As the dust buried farms on the Plains, the Nation witnessed for the first time a forced migration of some of its people.

All at once the message that the early conservationists had tried to get across was vividly dramatized. Sometimes it takes a calamity to bring about action, and the Dust Bowl did just that. The Dust Bowl was the combined effect of all that was happening to the Plains at a particularly distressing time. It was big and dramatic, and it focused the attention of the people on soil conservation. But soil had been eroding and deteriorating in many other places and in many other ways.

It was in this setting that the soil conservation movement got its start, in the late 1920's and early 1930's. A Federal appropriation was made in 1929 to study the effects of erosion and ways to control it. Ten experiment stations were established to operate in cooperation with State land-grant colleges. Their findings have been used to guide conservation work not only in this country but throughout the world.

The Soil Erosion Service was established in 1933 as an emergency agency. It set up watershed demonstrations in strategic locations so that farmers and ranchers could see erosion-control measures demonstrated and then try them out on their own land. This method met with only limited success. Many farmers came to the demonstration farms and saw what was being done, but few had either the skill or the money to put the practices to work on their own land. Every farm was different from every other farm; and it was learned early that conservation measures must be tailored to fit an individual farm.

The Soil Conservation Service (SCS) was established as a permanent agency of the Department of Agriculture to succeed the Soil Erosion Service. It attempts to marshal the various sciences and technologies of conservation and make them available to the people or agencies that own and operate land. In the United States about 75 percent of the land is owned by individuals or groups of individuals—and virtually all the food and fiber produced in the nation comes from these private holdings.









*Farmers consult SCS conservationists when working out their farm conservation plans.*



## Conservation Districts

SCS accomplishes its work by providing professional and technical assistance in soil science, agronomy, engineering, biology, range management, forestry, and related fields to individuals, groups, and communities through conservation districts, watershed associations, resource conservation and development projects, and others.

Its work did not really get going until 1937 when the first soil conservation districts were formed. Since then conservation district legislation in all 50 States has been enacted, and now nearly 3,000 districts are in operation.

A conservation district is a local unit of government somewhat like a school district. It is a subdivision of a State made possible by State law.

This isn't to say that a State divides its territory into districts. What most States do is provide the legal opportunity for the land owners and operators of an area to form a district themselves by voting for it in a referendum. Generally, once a district is formed, the people elect a board of supervisors. These supervisors, who serve without pay, plan long-range programs for the district, coordinate conservation projects involving more than one farm or ranch, and negotiate with Federal and State agencies for technical and financial help.

Districts receive technical, educational, and financial help from private organizations, State agencies, and such Federal agencies as Agricultural Stabilization and Conservation Service, Forest Service, Fish and Wildlife Service, Extension Service, and Farmers Home Administration. Generally the bulk of the technical aid comes from the Soil Conservation Service.

A land owner or operator who wants help from his conservation district signs an agreement with the district. He is then known as a district cooperator.

One of the first lessons learned in getting conservation on the land was that people as well as soil are involved. Since virtually all land to be treated with conservation measures is privately owned, it is necessary that land users themselves carry out the work and have something to do with the plan-



ning. Even though the professional conservationists had learned the answers to many of the physical problems, they came to realize that they could not do the work themselves—that some way had to be found to get the man on the land to see the problem, to want to do something about it, and to learn how to do the work himself. This is where soil conservation districts filled a need.

Another lesson learned early was that there are essentially two basic steps to soil and water conservation on a tract of land. The first is to determine the maximum safe use—crops, grass, trees, wildlife, recreation, or other use. The second step is to apply conservation practices that conserve water and protect the soil while it is in that particular use. This idea of using the land as efficiently as possible while protecting the soil is simple in theory but complex in practice. Even the simplest conservation measure can get complicated in adapting it to a particular farm or ranch.

### Soil Surveys

To determine the maximum safe use for an area, something must be known about the soil. A soil survey can supply the needed information. A soil survey reveals what can be learned about a soil from field examination—how deep it is; its inherent productivity; whether it is wet or dry, sandy or sticky; how much slope it has; how badly eroded it is; if it contains salts; and other important information. The information gathered in the field is supplemented by laboratory studies.

In making a soil survey, a soil scientist bores and digs into the soil, studies it and tests it, describes in detail what he finds, and outlines soil boundaries on the aerial photograph that he uses as a base map.

The information from a soil survey is interpreted for many uses. Many interpretations are for nonfarm uses, such as road construction, home building, laying pipelines, and suburban planning. But one of the most widely used interpretations—the land-capability classification—is for devising a farm or ranch conservation plan.

In this classification the individual soils are grouped according to the crops they are

capable of producing and the risk of soil damage if they are mismanaged. There are eight major groups, or classes, and these are designated by Roman numerals I to VIII. Soils in classes I, II, and III are suitable for cultivation. Soils in class I require little conservation treatment, those in class II require some treatment, and those in class III require considerable treatment to protect against or overcome erosion and other hazards. The soils in these 3 classes make up 44 percent of the private rural land in the United States, not counting Alaska and Hawaii.

Soils in class IV are marginal for cultivation but suitable for other agricultural uses such as pasture and woods. They account for 12 percent of the land.

Soils in classes V to VIII are generally not suitable for cultivation and should be kept in permanent vegetation. These soils also make up 44 percent.

A map that shows the soils interpreted in this way is called a land-capability map.

When an area, usually a county, has been completely surveyed the information is published. At present soil surveys for about half the land in the United States have been published.

From a national standpoint the soil survey is an inventory of the Nation's soils. It maps the soils, describes them in detail, and places them in a national system of classification. This national soil survey is done cooperatively by the Soil Conservation Service and, usually, the State agricultural experiment stations.

### What Is Soil Conservation?

Soil conservation concerns itself with using the land as efficiently as possible while protecting the soil. Do not be misled by the mildness of this statement. Civilization itself is at stake.

An important fact borne out by the 10 soil conservation experiment stations established in 1929 was that if soil is well vegetated, whether with grass or forest, wind does not blow it and water does not wash it away. An experiment illustrates this forcefully: On a plot where the slope was rather steep and the soil was kept cultivated and



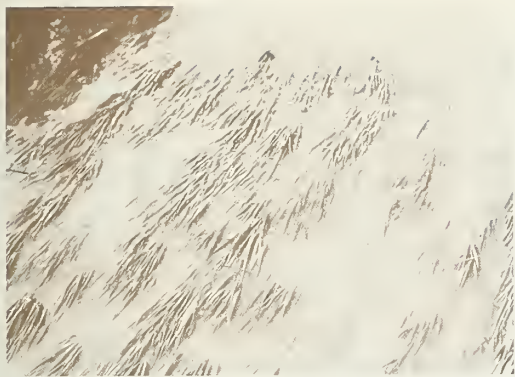


*A soil survey provides the information  
for safe use of the land.*









*When covered with plants, soil is protected against erosion.*

*Planted field strips help increase many kinds of wildlife.*

without grass cover, soil eroded at a rate that would lose 7 inches of topsoil in 11 years. On an adjoining plot, where the soil was kept in thick-growing grass, to lose the same amount of soil would take 34,000 years.

Severe storms and drought can damage a well-vegetated soil, but the return to stability is usually rapid. This is because the force of rain and wind is reduced by blades of grass thus preventing the severe dislodging of soil particles. And water running off the soil is slowed down by the grass, stems, and vegetative debris. Decaying vegetation, like a sponge, absorbs water and thus reduces the amount that could run off.

An objective of the soil conservationist then is to devise methods of producing needed crops and at the same time protecting the soil against the elements.

This results in a sort of compromise. To illustrate: A field is plowed and tilled to grow corn or cotton. So, though plant cover cannot be kept on the field all the time, a close-growing crop can be kept much of the time—perhaps one-half or one-third of the time. This can be done by rotating the crops, by using a cropping system that alternates tilled crops with grasses and legumes.

Other conservation measures can be used to help reduce the risks brought on by removing the plant cover.

Conservation enables the individual to farm efficiently and reduce his costs. Because he can produce more per acre, he can use fewer acres to get the same harvest as before. And the benefits multiply. Using fewer acres allows him to limit his cultivated crops to the soil best suited to them. He can protect the other soil with grass and trees; and frequently this permits him to make money from livestock and lumber. Recreation too is becoming an important source of income for the farmer. He can convert acres unsuited to agriculture to hunting preserves, camping sites, picnic grounds, and the like.

One of the great side benefits of conservation farming is the increase in many kinds of wildlife. We have more game birds, game mammals, furbearers, and game fish in the United States today than were here when white men first set foot on American soil. We have thousands of acres of man-made ponds, watershed lakes, and reservoirs stocked with game fish. Many of these are in areas where there had been little or no fishing. The thousands of miles of field borders, fencerows, windbreaks, ditchbanks, grass waterways, and terraces that conservation has brought forth provide food, cover, and travel lanes for upland game. As soil and water conservation spreads, fish and wildlife populations expand along with the hunting, fishing, and other recreation that naturally follows.

## Conservation Practices

Contour farming is one of the easiest conservation practices to use. When rows of plants and plow furrows run downhill, water flows down between the rows or in the furrows, speeds up, and takes soil with it. The water flows off the field so fast that only a little soaks in. By plowing and planting across the slope, the water being pulled downhill by gravity is intercepted by the furrows and plant rows. When farmers plow on the contour, their furrows wind around the slopes, on the level. These curving furrows make a pattern pleasing to the eye.

Even though contour rows intercept a great deal of water, they may fail during heavy rains. Stripcropping offers added protection. Row crops such as corn or cotton protect the soil very little. Close-growing crops such as grass and clover do much better. By putting strips, or bands, of close-growing crops between strips of row crops, erosion can be reduced considerably.

Water may spill over the level furrows in a row-crop strip and start to run downhill. But when it runs into the grass strip it slows down, drops the soil particles it is carrying, and soaks into the soil.

Stripcropping is also widely used to control wind erosion. The strips are laid out at right angles to the prevailing wind instead of on the contour. Strips of wheat may be planted between strips of sorghum. The sorghum grows taller than the wheat and breaks the wind. The taller plants also tend to lift the wind off the shorter ones. If a wheatfield were not stripped, the wind would sweep across without hindrance.

Terraces are low rounded ridges of earth built across a sloping field to intercept water. They are built to curve around the hill either on or nearly on the contour. They are built exactly level where the land is almost flat and there is little rain and also where the soil is very porous and can soak up a lot of water. But where the soil cannot soak up all the rain that falls, terraces are built to slope downward slightly so that the water flows slowly from the field to a waterway or to some place where it can be discharged from the field without cutting a gully.



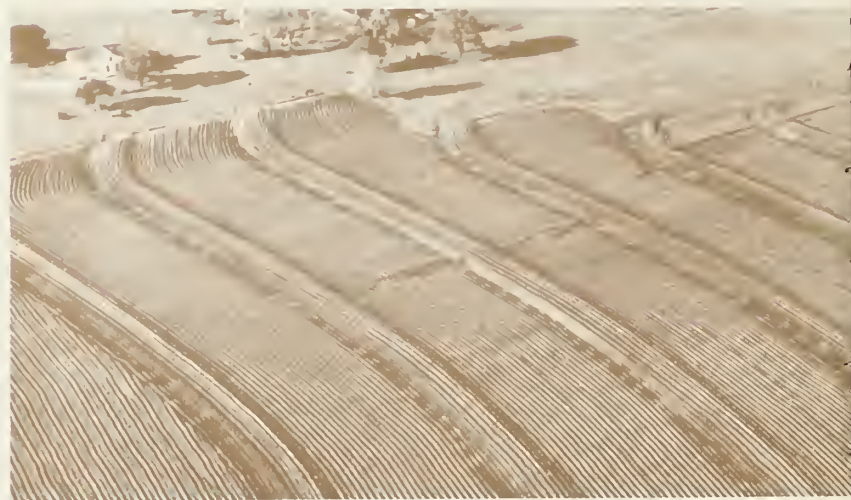
A.



B.



C.



D.

- A. Contour furrows hold water until it is absorbed.
- B. Contour rows intercept a great deal of water; strips of close-growing crops between strips of row crops offer added protection.
- C. Terraces (foreground) and stripcropping protect fields against erosion.
- D. Parallel terraces intercept water that would otherwise run downhill.
- E. Strips at right angles to the prevailing wind help control wind erosion.





*E.*



A.



B.

- A. Grass waterways collect surplus water and carry it safely from the field.
- B. The shaded border of a cropped field cannot support the crop but can provide a habitat for wildlife.
- C. Farm ponds are an excellent land use; they contribute substantially to better living on the farm.



C.





Grass waterways are broad gently sloping channels that carry water slowly and safely off the field. They are covered with a thick carpet of grass that keeps the water from cutting into the soil. Grass waterways are usually built where water collects naturally.

Although grass waterways may take up considerable room, the land is by no means wasted. Grass growing in the waterway can be used for pasture or meadow. The farmer can cut the grass for hay and use it to feed his animals. Certain ground-nesting birds use waterways for their homes, and other forms of wildlife use them for food and cover.

A farm pond is an excellent conservation practice and can be planned for several uses. The pond built to heal a gully can provide the water for livestock or for putting out fires, irrigating the garden or orchard, swimming, or skating. It can be stocked with fish and can be a home for ducks, muskrats, and many other desirable forms of wildlife, including birds. More than a million farm ponds have been built by farmers and ranchers as part of their conservation plans.

Along the edge of a cultivated field runs a strip of land on which crops do not grow well. This strip, called a field border, often erodes faster than the rest of the field because excess rainwater flows from the crop rows to the edge of the field. Sometimes a gully starts in just this way. By planting field borders to some useful plant the farmer can prevent erosion and at the same time provide food and shelter to helpful birds and other small animals.

Legumes, grasses, and shrubs are planted as field borders. Bicolor lespedeza, a shrub that is also a legume, is common in the South. A legume takes nitrogen from the air and adds it to the soil.

Crop rotation is a good conservation practice for soils that are predominantly used for cultivated crops. Crop rotation is a



systematic changing of crops to help prevent soil erosion and soil exhaustion—a tilled crop is followed by a small grain and then by grass and a legume. The rotation may take 3 to 5 years or more to complete, depending on the erodibility of the soil and the needs of the farmer or rancher.

An example of a 3-year rotation is corn the first year, wheat the second year, and a mixture of clover and brome grass the third year. In this rotation the field is disturbed by cultivation only 1 year out of 3—when it is in corn. The many fibrous roots of the wheat, grass, and clover help to hold the soil in place, and the clover, being a legume, adds nitrogen. Experiments have shown that there is much less erosion under rotated crops than there is under a crop like corn grown year after year on the same land.

Leaving the stalks or stubble of plants like wheat on the surface also helps to hold the soil in place. This practice is called by several names, including mulch tillage and stubble mulching. The stubble helps to prevent the wind from drying and blowing the soil. It gradually decays and turns into humus. Soil with humus does not wash or blow as easily as soil without humus. Stubble mulching is used in the Great Plains to help reduce wind erosion. But it helps in any part of the country. Scientists have proved that this practice is good for the soil, and farmers using soil conservation methods now make full use of any plant leftovers they have.



*Corn stalks shredded and left on the surface throughout the winter protect the soil.*

Especially on the open prairies and plains, the winds get a good clear sweep across the land. If soil is bare and exposed, wind erosion can be serious. One way to help cut down the effect of winds is to plant tree windbreaks, or shelterbelts, across their path. In some places a single row of trees is enough, but in most places several rows with shrubs on the outer sides are needed. Windbreaks protect crops as well as soil and help to shelter animals and the farmhouse and other buildings.

A good pasture or range is a fine protector of soil. But pasture and range must be given good care. If livestock eat forage plants too closely, these plants cannot grow fast enough to keep the soil from becoming bare and exposed to wind and water. Good pasture and range management requires knowing when to put the grazing animals on, how many to put on, and when to take them off.

A woodland that is properly managed offers almost perfect protection to soil. The trees slow the force of the raindrops, and the soft thick mulch of dead leaves and twigs cushions their fall.

Because fire destroys the mulch in addition to burning the trees, woodlands must be protected against fire.

On many farms the most productive soil is too wet to grow good crops so the farmer has to cultivate his hillsides or low-producing areas to grow enough crops. By draining his fertile land the farmer can plant the steep, erodible hillsides and the low-producing areas to grass and trees—a much better use. Drainage used this way is a conservation practice. It allows the farmer to use his land efficiently.

Wetlands can be drained either by open ditches or by underground drains, usually tile. Each method has its place, and each has advantages and disadvantages.

One requirement for drainage is an outlet. If the area is so low that there is no outlet and the land is valuable enough, the water can be allowed to collect in a low place and then pumped off.

In open-ditch drainage, surplus water moves over or through the soil to the ditches, which are spaced according to the soil, and is carried to the outlet. In tile drainage, water seeps through the joints between the tile and flows through the tile to the outlet.

Conservation irrigation means using irrigated soils and irrigation water in a way that will insure efficient production without wasting either water or soil. Soil erosion is

*Stubble mulching is used in the Great Plains to help reduce wind erosion.*







as great a menace to irrigated land in arid regions as it is to land in humid regions. Moreover, arid soils are generally low in organic matter, which leaves them highly susceptible to both wind and water erosion. Much of the erosion results from the misuse of irrigation water—using too much and applying it improperly.

In addition to causing erosion, uncontrolled irrigation water also causes serious drainage problems and salt accumulations on many irrigated fields. Or, if the surplus water passes through the root zone, it leaches out the plant nutrients.

Once irrigation water reaches the farm there are many ways it can be put on the land. One way is with sprinklers. This may be more expensive than other methods, but the rate of application can be more easily controlled, and thereby water is conserved and erosion damage is reduced.

Furrow irrigation is commonly used with row crops, such as potatoes and carrots. The water flows down the furrows between the rows.

In border irrigation a thin sheet of water is spread slowly over a strip of land between low ridges called borders.

There are other conservation practices not discussed here; and not all practices are techniques for conserving water and protecting soil. Conservation activities touch the lives of everyone, so we must consider the total environment. We must take account of what conservationists call the vulnerable values: wildlife, the beauty of nature, space for growing and living, pollution control, recreation. These are difficult to measure in dollars and cents.

## Farm and Ranch Conservation Plans

Using one conservation practice by itself is not enough to conserve soil and water. In



A.



B.

- A. Rows of trees can protect crops, soil, and farm buildings from the wind.
- B. A good range feeds livestock and protects the soil at the same time.
- C. A good stand of trees protects the soil and brings added income to the farmer.
- D. Grass is revitalizing land that had been cleared, plowed, and later abandoned for cultivated crops.
- E. An outlet ditch helps remove excess water from crop fields.
- F. Irrigated land also needs conservation practices.



*D.*



*E.*



*F.*



fact the application of single unrelated practices may increase the conservation risks on a farm or ranch instead of solving problems. The potential of any soil to respond to management is determined by the interactions among many soil characteristics. The response is always to a *combination* of practices, each complementing the other.

To illustrate: On sloping land a farmer could use crop varieties adapted to his soil; could apply fertilizer to balance the plant nutrient needs of his crops; could use plant-residue management and good tillage to insure adequate supplies of air and water in the rooting zone; and could control weeds and insects. But if he didn't build terraces he would lose through runoff the fertilizer and some of the needed water. Or, if he built terraces but left off fertilizer the lack of nutrients would result in poor yields. Therefore, in working out a conservation plan for a farm, ranch, camp, or other unit, it is essential to consider a combination of practices and soil treatments together with correct land use.

Any conservation plan for a farm, ranch, camp, or other area must include water management. Water management includes terraces, grass waterways, irrigation systems, and conservation drainage systems. It also includes treating soil so that it can absorb water in the form of rain or snow. Soils that become too tight because of little organic matter or too heavy cropping cannot take in water, and the result is excessive runoff. This may mean a lack of water later when crops need it, or it may mean damage by erosion.

The SCS through conservation districts helps land owners and operators make conservation plans. A trained SCS soil conservationist meets with a district cooperator, goes over his land with him, gives him alternate suggestions on what he might do and how and when to do it, and helps him make a conservation plan that is tailored for his farm, ranch, or other unit.

The land owner or operator makes all the decisions. He decides the use—crops, grass, trees, wildlife, or other use—of each field and the conservation practices needed to protect and improve the soil there. The SCS man prepares a land use map for him and a record of the conservation treatment for his land.

Together the written conservation plan and the land use map show what the land owner plans to do on each field and when. Thus it is that the mechanism of the conservation district gives to individuals or to groups a wealth of research and experience that enables them to be conservationists.

But districts have a new challenge facing them. They must invent new operating

machinery that will enable them not only to meet the basic needs of farmers and other land owners but also satisfy community development needs and provide a framework for greater public participation in resource matters.

Conservation districts might well consider their programs not farm programs alone, but resource programs. Conservation means efficient land use, whether that use is barley or buildings. Conservation means the development, protection, use, and management of *all* our resources for the needs and enjoyment of *all* the people.

## The Small Watershed

All the land in any one watershed drains to the same point. So all the farms, ranches, and towns in a watershed are tied together. That is, they share the problems of erosion, flooding, sedimentation, and water supply. They also share the benefits that come with solving these problems: a revived economy, more water for homes and industry, better scenery, new lakes for fishing and boating. And these benefits multiply into many others. It makes sense for the people in a watershed to work together.

The small-watershed program allows them to do so. Under this program conservation districts and other local organizations can get Federal help, both technical and financial, to plan and build structures, such as flood-prevention dams, that individuals cannot handle. The dams built under this program are generally smaller than those built by the U.S. Army Corps of Engineers and larger than those built under a farm conservation plan.

Even when the watershed is all farmland or ranchland, it is often easier to organize and carry out conservation under the small-watershed program. But the program is particularly effective in solving the conservation problems of towns located downstream. Such towns are often subject to flooding and sedimentation, and since these problems begin on the uplands of the watershed the towns cannot solve them without the cooperation of the land owners in the watershed.

For example, a valley town is periodically flooded. The town or county government joins with the local conservation district and any other interested groups to form a watershed organization. Together they apply to the Federal Government for a small-watershed project, giving the size and location of the watershed, the problems they want to solve, the present extent of damage, and the organization's source of funds.

If the project is economically sound—that is, if the values to be received are greater than the costs—it is approved and the or-

*In border irrigation a thin sheet of water is spread over a strip of land.*





ganization can arrange for the construction of a number of flood-retarding dams on the streams above the town. These, plus conservation practices applied by the individual farmers, control runoff from heavy rains and protect the town and the farmland downstream. The dams, in addition to retarding floods, can store water for many uses.

Watershed organizations must have money of their own. They do not pay for flood-prevention works—the Federal Government does. But they pay at least half the cost of works for irrigation, fish and wildlife, and public recreation. The Federal Government pays the rest. The local organization pays all the costs for industrial and municipal water supply and the maintenance cost of all dams.

Frequently, a reservoir can be used for several purposes. That, in fact, is one of the great advantages of the small-watershed program.

## The Future

Because of our agricultural efficiency, we have the highest standard of living in the world. Not only do we have plenty of food, but we also buy it at low cost. Less than one-fifth of our take-home pay goes for food, as compared to one-fourth right before World War II. A typical European consumer has to work 4 times as long as the typical American consumer to buy the same amount of beef, 5 times as long to buy the same amount of ham, and 3 times as long to buy the same amount of cheese and eggs.

But our farmers and ranchers are not producing this abundance of food at no cost to their land. Actually, the high yields of crops, especially of such crops as corn and soybeans, are being produced in spite of the erosion that is taking place at a serious rate. Techniques that increase yields do not necessarily prevent erosion; much of our high crop production comes at a high cost in tons of soil washed from the fields. And just because these heavy erosion losses are occurring on soil that is deep and can, for the present, produce in spite of erosion is no assurance that this soil can continue to produce indefinitely.

Even though we have abundant food in this country now, we cannot be sure we always will. Every year our population increases by millions. By the year 2000 the United States can expect a population nearly double the present number. Can we expect our soil to feed these new masses if it is not carefully protected?

If the pressure for food gets heavy enough at some future time, we can drain the swamps and clear the woods along our east and gulf coasts. But this would be expensive—in engineering and in the loss of wild-

life, forests, and other natural resources. Furthermore, the soils would require heavy applications of fertilizer. We can, also at a price, bring water to more parts of our arid West. In either case, the cost of producing food would be high compared to what it is on naturally productive land.

What about the rest of the world? Already untold millions of people are undernourished. World population is rising by 50 million every year. Only an all-out effort on the part of all concerned to preserve and improve soils everywhere will guarantee the capacity of the land to produce the food needed to cope with the ever increasing population in this country and throughout the world.

Maintaining the capacity of our soil to produce food is one benefit of soil conservation. This and the objectives to reduce floods, stop sediment that is filling our streams and reservoirs, distribute water, plan for orderly urban expansion and community development, and provide new recreational facilities are in the best interest of the entire country as well as the individual farmer.

One urgent need now is for land for non-farm purposes—cities, industries, defense establishments, and recreational areas—to meet the demands of our growing urban population. Every year our cities take in another million acres of farmland. Large areas are being covered with concrete or asphalt. Such areas are impervious to water, so runoff is often greater. The fast-moving water presents a serious conservation problem for it can damage unprotected soil as it leaves the hard-surfaced area.

We cannot be smug or satisfied. Soil conservation work in the United States is only one-third done; only one-third of our farmland and ranchland is receiving adequate conservation treatment. Erosion is still a serious problem on much of our best land even after 30 years of concerted effort by farmers, conservation districts, and agencies of State and Federal Governments.

Soil conservation requires constant maintenance of what we have already accomplished, and our conservation programs of the future must be flexible enough to continually readapt themselves to a changing technology and a changing society. In shifting farmland to other uses, we should avoid, if we can, using the most productive soils for building sites. We can plan nonfarm expansion carefully to make sure there is room for parks and highways. We can control water to keep it from flooding and to direct it to places where it is needed. We can increase the efficiency with which productive soils are cultivated. And most of all, we can regard conservation as a program not just for the farmers but for the Nation.





- A. *A small flood-retarding reservoir collects floodwater and releases it slowly to prevent flooding.*
- B. *Recreation is a land use that is taking up more and more land.*
- C. *We are losing thousands of acres of farmland annually to home sites.*



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*Conservation farming keeps our land productive.*

